UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

3D SYSTEMS, INC.,	)	
	)	
Plaintiff,	)	
	)	Case No. 2:05-cv-74891
v.	)	
	)	Hon. Avern Cohn
ENVISIONTEC, INC., ENVISIONTEC GMBH, and **SIBCO, INC.**,	)	Magistrate Judge Hon. R. Steven Whalen
	)	
Defendants.	)	
	)	

DECLARATION OF DR. VOLKER SCHILLEN

I, Dr. Volker Schillen, submit this Declaration in support of Defendants' Motion for Summary Judgment of Non-Infringement. The facts set forth below are based on my personal knowledge, and if called to testify, I could and would testify competently thereto:

1. I am the Chief Technical Officer of Envisiontec GmbH, one of the defendants in the above-entitled lawsuit. My duties include, but are not limited to, software design and research and development.

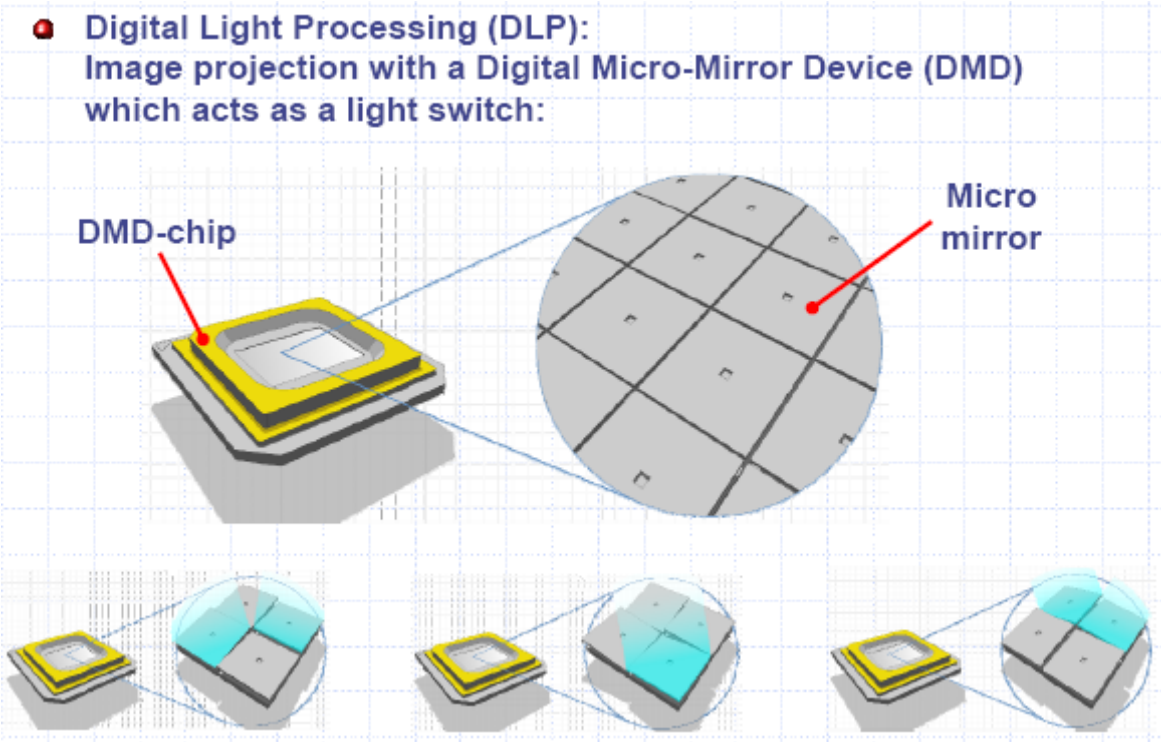
2. "Rapid Prototyping" or "RP" is a field that involves the manufacture of solid, three-dimensional objects through automated processes.

3. I have been employed in the Rapid Prototyping field since 1996. I received a PhD in Computer Science from the Technical University in Stuttgart in 2001. I also received an undergraduate degree from the Technical University in Karlsruhe in 1996.

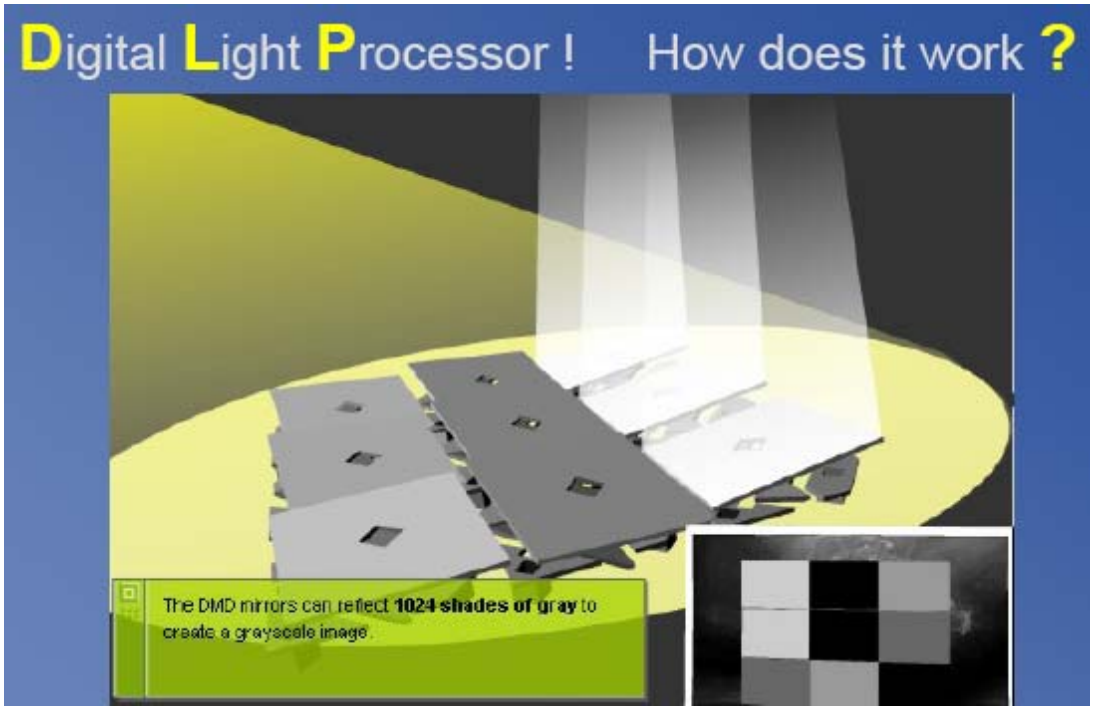
4. Envisiontec GmbH designed and currently manufactures rapid prototyping devices under the name “Perfactory”. Each of the Perfactory devices uses a software program called the “Perfactory Software Suite.” I am the principal designer and developer of the Perfactory Software Suite and am very familiar with its operation and functionality. One of my current responsibilities at Envisiontec GmbH is to maintain and update the Perfactory Software Suite as needed. In operation, the Perfactory Software Suite is located on a personal computer that is connected to the Perfactory device.

5. Envisiontec, Inc. assembles a different product called the “Vanquish,” which was recently re-named “PerfactoryXtreme.” The Perfactory Software Suite is also used on the Vanquish machine. Under my direction, Envisiontec GmbH supplies the Perfactory Software Suite to Envisiontec, Inc.

6. I am familiar with the designs of the Perfactory and Vanquish devices. Both of them use a digital light projector (“DLP”) to apply light to a curable resin. The DLP includes an array of mirrors, each of which projects light of a particular intensity to a specific location on the resin for a predetermined period of time. The following is a generic illustration of the DLP technology:



7. The movement of the mirrors in the DLP projector dictates the intensity of light projected from them. Each mirror projects a unique light intensity to a location on the surface of the curable resin. The light intensity and the length of time that is applied determine the depth to which the resin is cured. A unique curing depth is provided for each location on the surface of the resin corresponding to a respective mirror from the array of mirrors in the DLP projector. The following illustration shows that the DMD mirrors can reflect 1024 shades of gray to create a grayscale image.



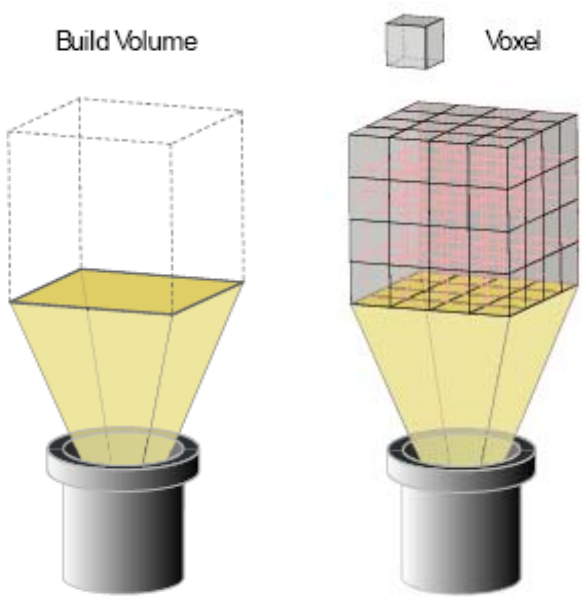
8. The Perfactory and Vanquish devices do not draw upon a two-dimensional surface. The use of the DLP projector in the Perfactory and Vanquish machines is substantially different from the process shown in the patents in suit that applies laser light by drawing upon a two-dimensional surface.

9. The Perfactory and Vanquish machines also do not form layers or cross-sectional layers. The digital light projector (DLP) projects a uniquely assigned intensity to each location across the resin. These independent intensities result in unique cure depths for avoiding the formation of cross-sectional layers. To my knowledge, the DLP projector used in the Perfactory and Vanquish devices is a completely new approach for curing resin in a rapid prototyping process.

10. We designed the software for the Perfactory and Vanquish machines to create a solid model of an object based on a computer aided design ("CAD") model. Unlike the patents

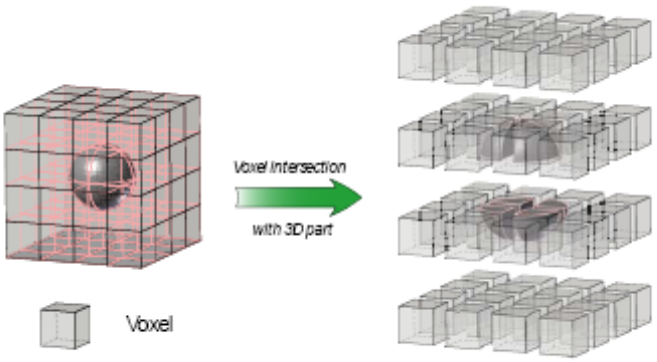
in suit, however, we developed a new approach for processing the information from the CAD model for the Perfactory and Vanquish devices. The Perfactory Software Suite (which is used on both the Perfactory and Vanquish machines) includes a module called "Perfactory RP". Both the Perfactory and Vanquish machines convert the CAD model into individual "voxels" or "volumetric pixels" that dictate the movement of the mirrors in the DLP projector. Each individual voxel corresponds to a specific mirror in the DLP projector. Each mirror is capable of projecting light intensities ranging from 0-255, with 0 being the minimum intensity and 255 being the maximum intensity. Thus, each voxel uniquely corresponds to one of the mirrors in the DLP projector and dictates the intensity of the light projected from that mirror to the resin. Moreover, the projection system used in the Perfactory and Vanquish devices project millions of squared light spots in a matrix onto the resin, and this process of voxelization is a new approach substantially different from the approach disclosed as "slicing" and creating layers by drawing using a laser, as disclosed in the patents in suit.

11. I am personally familiar with the software that is used for the voxelization process in both the Perfactory and Vanquish devices. The first step in the voxelization process is to create a build volume based upon the computer aided design ("CAD") model. The build volume is then subdivided into a large number of grid volumes which are called voxels. I have illustrated below a build volume that has been subdivided into voxels.



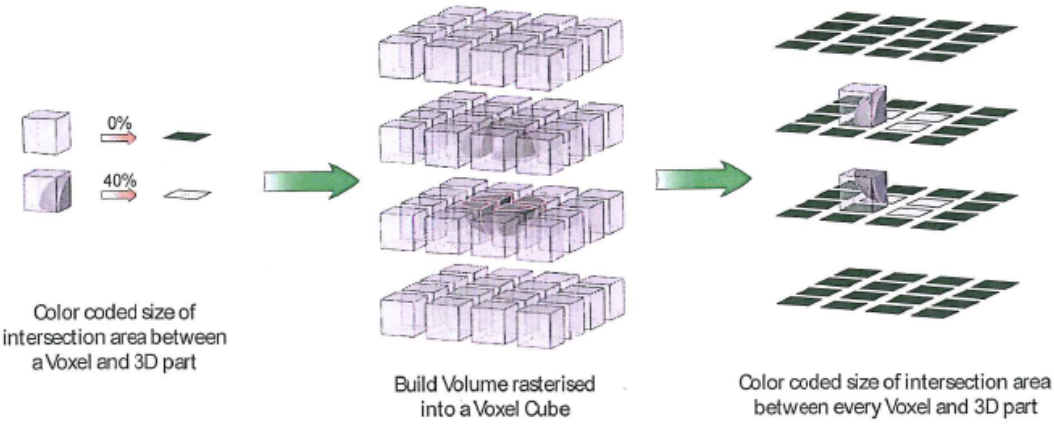
12. The three-dimensional build envelope or volume that is subdivided into voxel volume elements is known as a voxel matrix. The next step in the software is to determine the intersection between each voxel volume and the three-dimensional part to be manufactured. The intersection amount, if any, is converted into a brightness intensity value that is unique for each voxel volume and independent of any other voxel volume. The brightness intensity values (grayscale values) are used to generate a bitmap stack for the entire build volume of the part to be manufactured before any exposure takes place. I have illustrated below the process performed by the software in the Perfactory and Vanquish devices for determining the intersection between a voxel volume and the three-dimensional model; the assignment of brightness intensity values that are unique for each voxel volume and independent of any other voxel volume; and the generation of a bitmap stack for the entire build volume of the part to be manufactured before any exposure takes place.

Estimation of the intersection between every Voxel and the 3D parts:

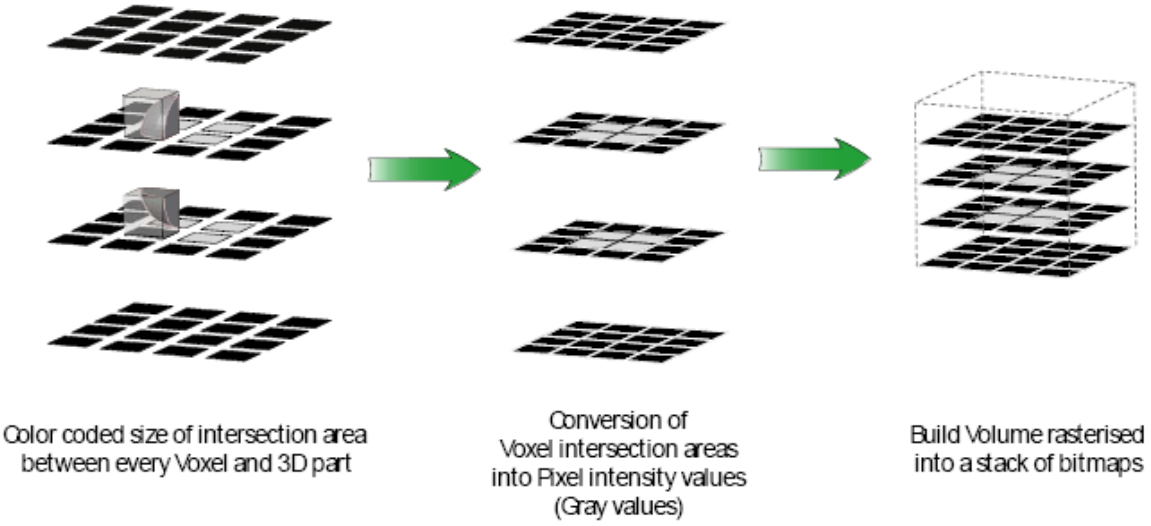


Intersection between a Voxel and Sphere

Color coding of the size of the intersection area:



Conversion of the colour coded intersection volume into pixel brightness intensity values and generation of a bitmap stack:



13. I have also prepared an animation for illustrating the voxelization process used by Envisiontec in its Perfactory and Vanquish machines, which is attached to Envisiontec's Motion for Summary Judgment as Exhibit 4.

14. It is my understanding that the patent claim words "data representing the three dimensional object" has been interpreted by the Court as meaning "providing data representing adjacent cross sectional layers of the three dimensional object to be formed which was generated on CAD system". As set forth previously, in the Perfactory and Vanquish devices, the entire build volume, including each of the subdivided voxel volumes, is rasterized into a stack of bitmaps which contain individual and unique brightness intensity values for each of the voxel volumes in the entire build platform. The unique and individual brightness intensity values for each of the voxel volumes are set before any building takes place. By using the voxelization process, there are no adjacent cross sectional layers and the voxelization process does not provide data representing adjacent cross sectional layers. There is only one individual intensity value for each voxel volume and each voxel volume may have a different size in the X, Y, and Z directions.

15. The information that is provided on an individual voxel volume by voxel volume basis to each individual mirror in the DLP projector is completely different than providing "data representing adjacent cross sectional layers". With the Perfactory and Vanquish devices, it is possible to increase the depth of curing for each voxel volume and the individual depths of curing for each individual voxel volumes are independent of each other. It is also possible to increase the depth of curing for each individual voxel volume beyond the maximum voxel depth by first exposing the individual voxel volume with its assigned grayscale value, e.g., 255, and then increasing the exposure time for that specific voxel volume to increase the depth of cure beyond the maximum voxel volume depth. Thus, because of the individual uniqueness to each voxel volume, there are no cross sectional layers or data representing "adjacent cross sectional layers" in the voxelization process used for the Perfactory and Vanquish devices.

16. The software used for the Perfactory and Vanquish devices does not generate data representing adjacent cross-sectional layers of the three-dimensional object being built. Nor does the Perfactory device include any computer that represents the object in this manner. Further, the voxelization process used in the Perfactory and Vanquish devices differs substantially from generating data representing adjacent cross-sectional layers. Through my prior employment and my university coursework, I am familiar with processes that represent solid objects as adjacent cross-sectional layers. In order to obtain cross-sections of an object from a curable resin, the resin must be cured by applying light of a uniform intensity across the surface of the resin so that the resulting cured section is of uniform thickness. As a result, at each position along the height of the object, the data representing the cross-sectional layer at that height must represent a uniform light intensity. The voxelization process used in the Perfactory and Vanquish devices, vary the light intensity for each voxel volume which allows for fine

variations in the object contours to be captured in the solid model. This results in improvements to the accuracy of the part build (i.e., it more closely resembles the CAD model) and a greater degree of resolution than is possible when cross-sectional layer data is used as disclosed in the patents in suit.

17. As previously described, each of the mirrors in the DLP projector responds to individual and unique brightness intensity information for each voxel volume which is contained in the stack of bitmaps. The DLP projector does not respond to adjacent cross-sectional data. Further, the projection of light on a curable resin in accordance with individual and unique brightness information for each voxel volume differs substantially from exposing a photopolymer to light in response to "data representing adjacent cross sectional layers". Through my employment in the rapid prototyping industry and my coursework, I am familiar with systems that expose a resin in response to adjacent cross-sectional layer data. When the exposure is performed in response to cross-sectional layer data, an equal light intensity must be applied across the surface of the resin to ensure that the depth of curing is constant. The use of a DLP projector that responds to individual voxel volume information allows a unique light intensity to be assigned to each voxel which in turn provides a greater degree of accuracy and resolution in building the part than is possible when the resin is exposed to light that corresponds to "data representing adjacent cross sectional layers".

18. Although the Perfactory Software Suite receives a CAD model as an input, it does not generate CAD models. None of the Perfactory or Vanquish devices are capable of generating CAD models.

I declare under penalty of perjury under the laws of the United States of America that the foregoing is true and correct.

Executed on this, the 29 day of July, 2008.

Dr. Volker Schillen

CERTIFICATE OF SERVICE

I hereby certify that on August 4, 2008, I electronically filed the foregoing paper with the Clerk of the Court using the ECF system which will send notification of such filing to the following: Jonathan A. David, Susan M. Kornfield and Alan N. Harris, and I hereby certify that I have served the foregoing paper via Federal Express on the following non-ECF participants:

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